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THE UTILIZATION AND PROCESSING
OF FRUITS AND VEGETABLES IN THE SOVIET UNION

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CURRENT SERIAL RECORDS

I. Introduction

In two previous papers I have discussed various features of the production and marketing of fruits and vegetables in the Soviet Union.^{1/} But beyond some general observations about processed products at retail, I did not say much about the utilization and processing of these items. I have recently assembled some information which will help rectify this situation. Utilization will be discussed first, followed by an examination of processing. Finally, Soviet plans and problems in these areas will be considered.

II. Utilization

The utilization of fruits and vegetables is reported in terms of quantities which are used for nonfood and food purposes.^{2/} The nonfood category is broken down into: waste and seed, feed, and industrial use. The industrial use category includes such items as the production of alcohol from potatoes. Certain forms of utilization of private production by the peasants -- particularly the production of starch or vodka -- may not be fully reported. Data for the years from 1959 to 1961 are reported in Table 1.

Consider first the division between nonfood and food uses. On a total tonnage basis, a substantial proportion of the available total supplies are utilized in nonfood forms. This is largely due, however, to the heavy tonnage of potatoes used for these purposes.^{3/} The proportions of fruits and other vegetables used in nonfood form is considerably lower. As a result, food usage was over 86% for fruits and nearly 73% for vegetables, as opposed to less than 35% for potatoes.

* Economist, Fruit and Vegetable Marketing, Division of Marketing and Utilization Sciences.

- ^{1/} "Some Observations on the Marketing of Fruits and Vegetables in the Soviet Union," Mimeo D-11, October 1964, 12 pp.; "The Role of the Private and State Spheres in the Production and Distribution of Fruits and Vegetables in the Soviet Union," Mimeo D-13, March 1965, 7 pp.
- ^{2/} The statistics for potatoes are reported separately from other vegetables because of the magnitude of their production; the same will be true of tomatoes in the processing sector of this paper.
- ^{3/} Other data suggest that during the 1963-1964 season, the nonfood proportion for potatoes was 62.7%, slightly less than the figure cited in Table 1. Within this breakdown, feed was reported as considerably less (15%) while the other two categories were somewhat higher. (Werner Klatt, "Output and Utilization of Foodstuffs in the Soviet Union," Studies on the Soviet Union, 1964, (Vol. III), (No. 4, p. 109).

Table 1. Utilization of Fruit and Vegetable Supplies
in the Soviet Union, 1959-1961^{1/}

Measures & Forms of Utilization	Commodity ^{2/}			
	Total	Fruit	Vegetables	Potatoes
<u>Millions of Metric Tons</u>				
Nonfood	61.6	1.9	5.2	55.5
Waste & Seed	37.7	0.8*	3.8*	33.2
Feed	19.3	--	1.4	17.8
Industrial	4.5	--	--	4.5
Food	48.2	4.7**	13.9	29.6
Total	109.7	5.6	19.1	85.1
<u>Percent of Commodity Total</u>				
Nonfood	56.1%	34.5%	27.3%	65.3%
Waste & Seed	34.4	13.9*	19.8*	39.0
Feed	17.6	--	7.5	21.0
Industrial	4.1	--	--	5.3
Food	43.9	86.2**	72.7	34.7
Total	100.0%	100.0%	100.0%	100.0%

Notes:

1/ Of total supply, 99.2% was composed of domestic production and 0.8% represented imports (mainly fruits).

2/ Figures may not add up because of rounding.

* Largely waste; negligible quantities used for seed.

** Of this total, 1.1 million tons, or 20.7% of the total supply, represented grapes which were made into wine.

Source: Compiled from data presented in Food Balances for 8 East European Countries, 1959-61, U. S. Department of Agriculture, Economic Research Service, ERS Foreign-124, May 1965, p. 8.

and vegetables are considerably lower than for potatoes.^{4/} The feed category is particularly important for potatoes,^{5/} less important for vegetables, and

^{4/} Waste and seed are grouped together in the data cited here. It has been suggested in a footnote to Table 1 that the figure for fruit and vegetables is primarily waste. Seed use is much more important in the case of potatoes: Klatt's data (loc. cit.) suggest that during the 1963-64 season, seed represented about two thirds of the total crop (this would place the potato waste figure slightly above that for fruits and vegetables).

^{5/} As noted above (fn. 3) Klatt indicates that the feed category was less important during the 1963-64 season. Some feed use may represent potatoes which have spoiled sufficiently so that they cannot be used for human consumption.

of negligible importance for fruits. Only potatoes find their way into industrial use in any volume.

Of the quantities of fruits and vegetables used for food, most are marketed in fresh form. While documentation is lacking, it appears that generally only a relatively small proportion is processed.6/

III. Processing

Although processing probably takes only a small portion of fruit and vegetable production, it is a sector which is increasing in importance and which may be expected to become more significant in the future. We shall first examine some statistics concerning the industry and then turn to a summarization of first-hand observations.

A. Statistics

Available statistics on the processing industry center about canning, grape wine production, and imports. Comparable statistics were not found for freezing and drying--but both (especially the former) are probably of comparatively lesser importance. There is a certain, but also unreported, amount of home brewing of alcoholic beverages.7/

1. Canning. Details on Soviet fruit production by year and commodity are reported in Table 2.

It may be noted that total production has grown steadily and in 1963 was 66% higher than in 1958 and 204% higher than in 1953. Fruits and vegetables accounted for about 60.5% of all canned food production from 1955 to 1963; the percentage has run higher in recent years. During the same 1955 to 1963 period, canned fruit and vegetable production was broken down as follows: fruit 35.7%, vegetables 30.2%, tomatoes 23.9%, and juice 10.2%. The juice proportion has shown a particular increase.

2. Grape Wine. Grape wine production has also increased steadily. Statistics by year are reported in Table 3. In addition there is undoubtedly some unreported home production.

6/ An exception is provided by grapes. Nearly 58% of grape production during the 1959-61 period was used for wine production and manufacture (source cited in Table 1).

7/ Home production of grape wine and vodka from potatoes is not uncommon. It is reported that in the central and northwestern section of the country, peasants produce a vodka known as "Samogon" which is sold in urban areas. This practice provides additional income but is not condoned by the State and in fact may result in criminal action. (Eugene Wierbicki and F. E. Deatherage, "Union of Soviet Socialist Republics," in Food Technology the World Over, ed. by Peterson and Tressler, Avi Publishing Co., Westport, 1963, p. 302.)

Table 2. Soviet Production of Canned Fruits and Vegetables
(millions of standard cans)^{1/}

<u>Year</u>	<u>Total</u>	<u>Fruits</u>	<u>Vegetables</u>	<u>Tomatoes</u>	<u>Juices</u>
1932	398.6	98.3	77.2	223.1	--
1937	732.6	386.6	77.4	268.6	--
1940	757.7	263.4	109.4	341.2	43.7
1950	934.5	417.7	163.7	322.8	30.3
1952	1,231.3	606.3	278.3	285.6	61.1
1953	1,343.9	646.9	320.5	295.4	81.1
1955	1,777.7	677.3	521.3	439.7	139.4
1956	1,958.5	780.6	525.1	497.2	155.6
1957	2,266.0	933.0	511.6	625.9	195.5
1958	2,469.6	951.6	677.7	601.5	238.8
1959	2,576.6	930.6	775.8	596.6	273.7
1960	2,995.4	959.6	1,055.0	669.7	311.1
1961	3,637.7	1,132.9	1,258.3	837.2	409.3
1962	3,881.3	1,254.5	1,262.4	889.8	474.7
1963	4,089.7	1,295.6	1,348.6	883.8	561.7

^{1/} A standard can weighs 400 grams. This in turn is equal to 0.88 lbs. or 14.1 oz. (slightly less than half a U. S. No. 2½ can which holds 29.8 oz.)

Source: Narodnoye Khozyaystvo SSSR v 1958 godu, p. 315 (also 1960, p.354, and 1963, p. 210).

3. Imports. Imports represent a significant portion of the canned fruits and vegetables available in the Soviet Union. In 1963, for instance, imports represented about 443 million cans, more than 10% of domestic production. Details are reported in Table 4.

In terms of commodities, the imports of vegetables (equivalent to 20% of domestic production) were relatively more important than they were for fruits and tomatoes (equivalent to less than 8% of production in each case). Practically all, if not all, of the canned products came from Iron Curtain countries. The most important supplier of fruits and vegetables clearly was Bulgaria, followed by Hungary, Communist China, and Rumania. With respect to trends, from 1955 to 1961 the value of imports of processed fruit as a proportion of all agricultural commodities rose from 0.7% to 3.0% (comparable data were not reported for vegetables). ^{8/}

^{8/} Theodora Mills, Soviet Agricultural Trade, 1955-61, U. S. Department of Agriculture, Economic Research Service, ERS-Foreign-47, June 1963, p. 28.

Table 3. Soviet Production of Grape Wine

<u>Year</u>	<u>Thousands of Decaliters ^{1/}</u>	<u>Thousands of Gallons</u>
1940	19,695	52,030
1950	23,845	62,994
1952	31,531	83,299
1953	41,153	108,718
1955	47,376	125,158
1956	50,907	134,486
1957	55,238	145,928
1958	61,824	163,327
1959	66,896	176,726
1960	77,681	205,218
1961	84,751	223,895
1962	97,779	258,313

^{1/} One decaliter = 2.6418 gallons.

Source: Narodnoye Khozyaystvo SSSR v 1958 godu, p. 319 (also 1962, p. 210).

Table 4, Soviet Imports of Canned Fruits and Vegetables, 1963

<u>Source Country</u>	<u>Millions of Standard Cans ^{1/}</u>			
	<u>Total</u>	<u>Fruits</u>	<u>Vegetables</u>	<u>Tomatoes</u>
Bulgaria	225.3	61.3	115.5	48.5*
Hungary	148.6	16.3	132.3	--
Communist China	36.9	20.2	16.7	-
Other ^{2/}	32.0	4.7	6.8	20.5
Total	442.8	102.5	271.3	69.0*

Notes:

^{1/} A standard can weighs 400 grams.

^{2/} This figure is a residual.

* Converted from metric tons; approximate.

** Of this total, 11.3 came from Rumania.

Source: Compiled from data presented in Vneshnyaya Torgovlya SSSR za godu, pp. 48, 107, 114, 211.

B. Observations

It is not easy to get to see a Soviet processing plant without considerable advance preparation. When I was in Kiev in August 1964 as a tourist I tried to do so but was unsuccessful. But in the summer of 1960, a delegation of specialists under the auspices of the U. S. Department of Agriculture spent six weeks in the Soviet Union studying food processing. In the course of their tour they visited three fruit and vegetable processing plants. A general report was not published, but I have reviewed the papers by several of the team members pertaining to these plants.^{9/} Their observations are a bit dated now, but still may be relevant.

1. Types of Processing. The group found that most of the processing, as suggested earlier, was centered about canning. Some 90 to 95% of the equipment was reported to be the kind used in the U. S. 20 to 30 years ago. This is not surprising because the United States played an important role in getting the Soviet canning industry started -- both in terms of technical advice and equipment -- in the late twenties and early thirties.^{10/} However, the 1960 team noted that the Russians were beginning to install modern equipment, some of it imported from Europe.^{11/} The most important fruit and vegetable products were reported to be the following, listed in decreasing order of importance:

- Fruits: apples, plums, cherries, strawberries, and raspberries
- Vegetables: tomatoes, squash, egg plant, peppers, cucumbers, and green peas

There were 28 labels covering the various fruit items and 70 on vegetables. Plants pack meats and candy out of season.^{12/} Freezing was reported to just be getting underway. Output in 1959 was 10,000 tons. Production, however, is scheduled to increase and the group understood that instructions had

^{9/} My basic reference was a series of unpublished reports prepared by Milan D. Smith, then President of the National Cannery Association. (Mr. Smith is now Executive Vice President of this organization) Some of Smith's observations were summarized in two articles: "I Toured Russia's Frozen Food Plants," Quick Frozen Foods, December 1960, pp. 30-32 ff.; and "Inside Russia's Food Plants," Food Engineering, May 1961, pp. 74-76. Published articles by other team members include: G. E. Hilbert, "Inside Russia's Food Plants," Food Engineering, April 1961, pp. 33-36; and Wierbicki and Deatherage, op. cit.

^{10/} This matter will be discussed in some detail in my paper, "American Technology and Soviet Agricultural Development, 1924-33," which is scheduled to appear in Agricultural History, January 1966.

^{11/} Included were items such as equipment for a tomato paste plant from Hungary, a spray drying unit from Switzerland, and freezing equipment from Germany.

^{12/} Smith, op. cit. (Dec. 1960, notes); Hilbert, op. cit., 33; Wierbicki and Deatherage, op. cit., p. 303. It will be noted that citrus products were not mentioned.

been given that a freezing division was to be established in conjunction with all new canning plants. Products commercially frozen at the time included cherries, green peas, and corn on the cob. Beans and tomatoes were undergoing pilot plant testing. In view of the limited number of freezers at the retail level, it was assumed that most of the production was consumed by the "upper class."^{13/}

The group apparently did not see much in the way of dehydrating facilities. But they, like I, did see some dried fruit and retail - particularly sliced apples and prunes. It was their feeling that the fruit had been dried in open trays. Some work was being done on fruit and vegetable powders. These were used for producing special foods for infants and school age children. There was limited production of powders of peas, spinach, carrots, tomatoes, and apples; 2% cornstarch was used as a filler.^{14/}

2. Individual Plants. Three plants were visited. About a day was spent at each. Notes on each follow.

-- Stalin Canning Plant, Kherson, Ukraine.^{15/} This is one of the largest and most modern plants in the Soviet Union. The plant and grounds, which are located on the banks of the Dnieper, cover 45 hectares (111 acres). The annual capacity was 100 million cans per year and production was broken down as follows (in millions of cans): tomato products 59 (paste 43, juice 11, ketchup 5), other vegetables 35, grape juice 1, and meat 5. Some 4,000 employees were employed in plant and field operations; the management would have liked to have had 400 more.

Because of the plant's riverside location, extensive use was made of water for transportation; 60% of the raw material was brought in this way. Some 95% of the pack was shipped by rail or boat; the remainder was trucked. When products were sent to the far north during periods of low temperature, special heated trains were used.

With respect to processing practices, it appeared that little emphasis was placed on quality control or grades. Cans were not coded. Pallets were used in the warehouse. Use of paper cartons as master containers was limited.

-- Lenin Canning Plant, Odessa, Ukraine.^{16/} The Lenin plant presents somewhat of a contrast to the Stalin plant. It is older, smaller, and has

^{13/} Smith, op. cit. (Dec. 1960), pp. 30-32; Wierbicki and Deatherage, op. cit. p. 303; Hilbert, op. cit., p. 33.

^{14/} Smith, op. cit.; Hilbert, op. cit. p. 34; Wierbicki and Deatherage, op. cit. p. 304. As noted in fn. 11, a spray drying unit had been imported from Switzerland.

^{15/} Based on Milan D. Smith, "Visit to Stalin Canning Plant . . . July 8, 1960," 14 pp.

^{16/} Based on Milan D. Smith, "Visit to the Lenin Canning Plant . . . July 9, 1960," 10 pp.

an urban location. More specifically, it is located in the city on $4\frac{1}{2}$ hectares (11 acres). Production ran about 30 million cans. There were 1,000 full-time employees and 400 seasonal workers. Preliminary processing was done by three branches located on State Farms.

Originally it was known as the "Plant of Fruit Juices" but has broadened its line to include other fruit products. The best fruit was used for baby food, the second best for compotes, the third for jam, and the lowest discarded. The most important fruit juices were apple and grape, followed by plum, cherry and blackberry; some concentrated juice was used in the manufacture of soft drinks. It appeared that much of the pack was put up in 10 kilo cans and then later repacked. Much hand labor was used in the warehouse; cans were stacked individually.

During the winter some citrus from the Caucasus was processed into mamalade. Meat products put up during the winter included plain canned meat and items such as tongue in jelly and kidneys in tomato sauce.

-- First of May Canning Plant, Tiraspol, Moldavia.^{17/} This was a rather large plant, covering some 140 hectares (99 acres) and with a capacity of about 100 million cans. There were 1,200 year-round employees and 2,500 in season. In other respects it was much like the above two plants. It was one of 16 plants in Moldavia. In addition to canning, the plant did some freezing.

3. Other. Several other more general observations may be of interest. These concern containers and labor.^{18/}

A substantial portion of the fruits and vegetables are packed in heavy returnable glass jars. The return and cleaning of these jars is a cumbersome and time consuming task. The processors are attempting to increase their use of cans but are finding it difficult to do so because of the limited development of the tinplate industry. Some processing plants have can-making facilities nearby.

Labor was much more abundant than in American plants. The group estimated that it took an average of three people to do a job which could be done by one in the U. S. Part of this is because the Soviets did not make nearly as extensive use of labor-saving equipment as we do. Much of the packing, stacking, and moving of products was done by hand. On quite a different level, the sanitary facilities provided labor were generally considered abysmal.

IV. Plans and Problems

The Soviet Union, as I noted elsewhere, is in the process of expanding fruit and vegetable production. But as production increases, the problems of marketing become more severe. During the 1964-65 season, for instance, large quantities of produce spoiled because of inadequate marketing

^{17/} Based on Milan D. Smith, "Visit to the first of May Canning Plant ... July 12, 1960," 10 pp.

^{18/} Based on the various group references.

facilities. Much of the loss could have been avoided, according to the vice-chairman of the Moldavia State Planning Committee if additional processing facilities had been available.^{19/}

This situation is not entirely due to lack of paper planning. In 1960, plans were announced for the expansion of fruit and vegetable production to 5,900 million cans; ^{20/} yet by 1963, reported production was only 4,090 million cans, and planned construction for 1965 would add only 377 million (and there is some question as to whether this plan will be met).^{21/} Thus it appears that the 1965 goal may be far from achieved.

But if the Soviets have fallen behind in quantity, an even more serious gap exists with respect to quality and variety. In order to keep their can count up, processors have turned out products which are relatively easily handled, do not require much labor, and for which raw materials are readily obtainable. Thus there is a heavy production of products from such commodities as apples, plums, cabbage, and squash. In the process, quality has been neglected; ^{22/} indeed a recent Soviet inspection group touring the North Caucasus referred to the cabbage they tasted as being "meant for a zinc-lined stomach." ^{23/} Such a product, of course, is not in very strong consumer demand. The director of the Ukraine Food Products Wholesale Office reports that "substantial surpluses of products with an extremely limited market have now formed in industry."^{24/}

On the other hand, the quotas are not being filled for other products such as those made from small fruit (e.g. raspberries or strawberries). But aside from the difficulties of processing these items, the plants face the problem of the raw material supply being limited. Farms do not emphasize their production because they require a lot of labor, and this would

^{19/} P. Poletayev, "Moldavia's Generous Gift," (letter), Pravda, June 2, 1965, p. 2 (Current Digest of the Soviet Press, June 23, pp. 26,27). Also see G. Borisenko, "Where Should Fruit be Marketed?" Pravda, July 21, 1965, p. 2 (CDSP, Aug. 11, p. 36).

^{20/} Pravda and Izvestia, January 27, 1960, p. 1 (CDSP, Feb. 24, p. 13).

^{21/} I. Ganichev, "Practice and Problems of Light Industry: Construction Projects of Special Importance," Izvestia, July 10, 1965, p. 3 (CDSP, Aug. 4, pp. 34-35). Ganichev is vice chairman of the U.S.S.R. State Committee for Construction Affairs.

^{22/} T. Vasilenko, "Practice and Problems of Light Industry: Canned Goods, Demand and Conservatives," Izvestia, May 13, 1965, p. 1 (CDSP, June 2, p. 33).

^{23/} From an article in Pravda as noted by UPI and cited in The Washington Post, May 28, 1965, p. A-14. The Pravda article went on to note that "The tasters looked at the huge pile of cans with frightened eyes."

^{24/} Vasilenko, loc. cit.

detract from the production goals for other more important products. Thus, not only is the total pack of the more strongly desired items inadequate, but the variety is quite limited.25/

In either case, retail prices are high.26/ Moreover, the exterior of fruit and vegetables containers is regarded as "especially unattractive."27/

* * * *

Thus it appears that the Soviet Union has its work cut out for it. A larger portion of an increasing production needs to be processed. But the processing industry is not expanding rapidly enough; moreover, it has expanded as much as it has only by emphasizing quantity and neglecting quality and desired packs. The situation could probably be ameliorated by increasing the pace of plant construction, placing more of a premium on quality and type of pack, developing new products from the raw product in ready supply, doing a better job of merchandising, and lowering retail prices. But these things take time and money (although it appears that processing plants, once built, are quite profitable 28/). Whether the Soviet Union will increase the resources allocated to this sector in time to avoid more serious difficulties is not at all clear.

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25/ Poletayev, loc. cit.; Vasilenko, loc. cit.

26/ Wierbicki and Deatherage, op. cit., p. 303. See my listing of sample retail prices (mimeo D-11), p.9.

27/ Vasilenko, loc. cit.

28/ This statement is based on profit figures reported for individual factories by Smith in his notes and comments by Poletayev. Poletayev notes that such investments "are paid back in 18 months to two years."